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ABSTRACT

In phase 1 of this study, development and validation studies of a new assessment for the multiple intelligences were conducted. The second phase of the study was a pilot implementation project during a single academic year in collaboration with several public school teachers. Phase 1 involved a series of activities including initial instrument development, expert content reviews, field testing, pilot validation studies, item analysis, subscale development, instrument revision, and secondary validation studies. The developed instrument, the Multiple Intelligence Development Assessment Scales (MIDAS), was validated through studies involving nearly 3,000 middle school students, approximately 70 high school students, groups of adult and college students, and 400 employed adults. Phase 2 considered how a multiple intelligences (MI) profile might be best used by classroom teachers. Six elementary and secondary school teachers participated. Findings from this study indicated that an MI profile can sensitize teachers to their own weaknesses and help them empathize with students who are struggling. Teachers were able to understand the MI profile as a descriptive narrative of intellectual and creative life. Students of these teachers also appreciated the MI profile and found it encouraging. (Contains 5 tables and 21 references.) (SLD)

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Using a Multiple Intelligences Assessment To Facilitate Teacher Development

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C. Branton Shearer

In contrast to a "testing society", I think that the assessment approach and the individual-centered school constitute a more noble educational vision. I define assessment as the obtaining of information about the skills and potentials of individuals, with the dual goals of providing useful feedback to the individuals and useful data to the surrounding community.

Howard Gardner, author, *Multiple Intelligences: Theory in Practice.*

Introduction

This research builds on the findings of several investigators who have identified essential strategies for the successful implementation of multiple intelligences (MI) theory in schools and classrooms to enhance students' learning. These investigators have concluded that the implementation of MI ideas can have important benefits for students, including: increased student motivation and academic engagement (Chen, Krechevsky & Veins, 1998) and the promotion of teacher skills and personal development (Campbell & Campbell, 1999). A primary goal for the implementation of MI theory advocated by Howard Gardner (1995) is that instruction and curriculum be personalized so that students may use their intellectual strengths as a means to achieve greater academic and personal success.

The research reported here has investigated three interrelated propositions. First, a valid and reliable assessment for the multiple intelligences can be created. Second, teachers can use this MI profile to better understand, accept and create MI-inspired instruction and curriculum. Third, the MI profile can be used by both teachers and students to promote the use of "strength-based" learning activities.

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The Theory of Multiple Intelligences

In 1983, Howard Gardner published Frames of Mind: The Theory of Multiple Intelligences, in which he provided extensive research to support his contention that human intelligence is multifaceted rather than singular. Gardner (1999) defines intelligence as, "a biopsychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture" (p. 34). To qualify as an intelligence in Gardner's MI theory, each ability has to meet a range of criteria: the potential for isolated breakdown of the skill through brain damage; the existence of savants, prodigies, and other exceptional individuals with this ability; support from psychological training studies and from psychometric studies, including correlations across tests; evolutionary plausibility; and a distinct developmental history culminating in a definable set of endstate performances. In addition, each intelligence has to have an identifiable core operation or set of operations, as well as susceptibility to coding in a symbol system (e.g., language, mathematics, picturing, or musical notes) (Feldman, 1998).

Other multifaceted models of intelligence, such as Sternberg's (1988) triarchic theory, Thurstone's (1938) primary mental abilities theory, Guilford's (1967) structure of intellect theory, and Goleman's (1995) emotional intelligence model, have been introduced over the years. However, for a variety of reasons, these alternative theories of intelligence have failed to supplant the unitary theory of intelligence in the mind of most psychologists and educators and the structures of schools.

The eight intelligences identified by MI theory are Linguistic, Logical-mathematical, Spatial, Kinesthetic, Musical, Naturalist, Interpersonal and Intrapersonal. Each intelligence has its own memory system with cerebral structures dedicated to processing its specific contents

(Gardner, 1993). Each of the intelligences are comprised of a complex set of specific skills that embody both convergent problem-solving as well as divergent thinking abilities. The convergent problem-solving skills associated with the Linguistic and Logical-mathematical intelligences are those that are most valued in the typical classroom while the divergent thinking aspects of "non-academic" intelligences are least appreciated or even disparaged (Musical, Kinesthetic, Naturalist, etc.)

Linguistic and Logical-mathematical intelligences are most often associated with academic accomplishment. The core features of Linguistic intelligence include the ability to use words effectively for reading, writing and speaking. Linguistic skill is important for providing explanations, descriptions and expressiveness. Gardner describes the poet as the epitome of Linguistic ability. Other career fields requiring skill in this area include teaching, journalism, and psychology. Convergent aspects of Linguistic intelligence assessed by standard intelligence tests include vocabulary and reading comprehension. Activities requiring divergent thinking include story telling, persuasive speech, and creative writing.

Logical-mathematical intelligence involves skill in calculations as well as logical reasoning and problem-solving. People strong in this intelligence are usually the ones who are described as being "smart" (e.g., mathematicians, philosophers, logicians). Logical-mathematical intelligence is required for multi-step, complex problem-solving and mental math. Most IQ tests assess a person's ability to reason and problem-solve quickly but do not examine divergent and reflective aspects of Logical-mathematical intelligence, such as the identification of novel problems or the generation of new and worthy questions.

Musical intelligence includes sensitivity to pitch, rhythm, and timbre and the emotional aspects of sound as pertaining to the functional areas of musical appreciation, singing, and

playing an instrument. A composer requires significant skill in many aspects of this intelligence—especially involving creative musical thinking. On the other hand, musical careers (e.g., instrumentalist, vocalist) generally require more circumscribed abilities that emphasize technical skill rather than creative output.

The Kinesthetic intelligence highlights the ability to use one's body in differentiated ways for both expressive (e.g., dance, acting) and goal-directed activities (e.g., athletics, working with one's hands). Well-developed kinesthetic ability for innovative movement is required for success in professions such as choreography, acting, and directing movies or plays. Precision, control, and agility are the hallmarks of athletes such as karate masters, professional soccer players, and gymnasts.

Spatial intelligence includes the ability to perceive the visual world accurately and to perform transformations and modifications upon one's own initial perceptions via mental imagery. Functional aspects of Spatial intelligence include artistic design, map reading, and working with objects. Visual artists and interior designers exemplify creative spatial thinking, and a successful architect will need both the creative abilities as well as technical accomplishment. An automobile mechanic or engineer, on the other hand, does not need creative and artistic abilities to find the solution to a malfunctioning engine.

A person strong in the Naturalist intelligence displays empathy, recognition, and understanding for living and natural things (e.g., plants, animals, geology). Careers requiring strong Naturalist skills include farmer, scientist, and animal behaviorist. Skilled scientists use pattern recognition to identify an individual's species classification, create taxonomies, and understand ecological systems. Empathic understanding is a related ability that allows people to care for and manage the behavior of living entities.

Unique contributions of the MI model to educational theory are the personal intelligences. The Intrapersonal and Interpersonal intelligences are presented as separate yet related functions of the human brain (especially the frontal lobes). They are described as two sides of the same coin, where Intrapersonal emphasizes self-knowledge and Interpersonal involves understanding other people.

Vital functions of Intrapersonal intelligence include accurate self-appraisal, goal setting, self-monitoring/correction, and emotional self-management. Results of research have highlighted the importance of metacognition for learning in the basic academic skills of reading and mathematics (Forrest-Pressley & Waller, 1984; Mevarech, 1999). Intrapersonal intelligence is not the same as self-esteem, but it may be a strong factor in promoting self-confidence and effective stress management. Well-developed Intrapersonal intelligence may well be essential to an individual's sense of satisfaction and success. Careers that require skills in Intrapersonal self-management include pilots, police officers, writers, and teachers.

Interpersonal intelligence also plays a vital function in a person's sense of well being. It promotes success in managing relationships with other people. Its two central skills, the ability to notice and make distinctions among other individuals and the ability to recognize the emotions, moods, perspectives, and motivations of people, are known to be critical factors in successful employment. The ability to manage groups of people is required for managerial or leadership positions. Good teachers, counselors, and psychologists need to be adept at understanding a specific individual and then managing that relationship.

Methodology

There have been two main phases of this research. During Phase One a series of development and validation studies of a new assessment for the multiple intelligences were conducted. These projects followed standard procedures new test construction and were conducted over a period of six years. The results are reported in the test manual (Shearer, in press) and are briefly summarized below. The second phase of research reported here was a pilot implementation project conducted during one academic year in collaboration with several public school teachers. Teachers completed the MI assessment themselves and then they had students participate in MI assessment and awareness activities.

Phase One

The goal of Phase One was to create and investigate the validity of a new assessment for the multiple intelligences. Phase One involved a series of activities including: initial instrument development, expert content reviews, field testing, pilot validation studies, item analysis, subscale development, instrument revision and secondary validation studies.

Development of the MIDAS.

The MIDAS was developed over a period of six years using a combination of rational and empirical methods of test construction using MI theory as a basis to guide interpretation of empirical results. Initially, a large number of items (n = 125) were generated through a careful reading of the behavioral characteristics of each intelligence as articulated in Frames of Mind (Gardner, 1983, 1993). Subject area experts (including Howard Gardner) reviewed these questions. Items were then field tested via in-depth interviews, whereby interviewees provided feedback on question wording and content clarity. A series of quantitative studies were then conducted to examine inter-informant and test-retest reliability, item response patterns, and inter-

item correlations (Shearer & Jones, 1994; Shearer, in press). Based on these results, individual scales for each intelligence were constructed and a scoring system was devised. Eventually, within scale factor analyses were conducted to create and verify a number of domain-specific subscales within each of the intellectual scales (e.g., Instrumental and Vocal for Musical) (Shearer, in press).

Each MIDAS item has six response choices (e.g., "Are you good at finding your way around new buildings or city streets?" Not at all, Fairly Good, Good, Very Good, Excellent, I don't know or Does not apply). Response anchors are uniquely written to match each question's specific content. A Does not apply or I don't know option is provided for every question so that the respondent is not forced to guess or answer beyond his or her actual level of knowledge. Percentage scores for each scale are calculated from the total number of responses.

Exploratory and confirmatory actor analyses of the MIDAS revealed that a large majority of its items load primarily on the one factor that is associated with their designated construct. However, a small group of the items load on two or (in a limited number of instances) three scales. All of these co-loading items were found to be consistent with theoretical expectations. For example, a question regarding parallel parking a car correlates primarily on the Spatial scale but also with Intrapersonal (metacognition) and Kinesthetic (hand-over-hand turning of the steering wheel). A complex, computerized scoring system was devised that accounts for these various correlational patterns (Shearer, in press).

Psychometric Properties. Numerous studies have investigated the reliability and validity of the MIDAS, all of which are summarized in detail in The MIDAS Professional Manual (Shearer, in press). Based on the results of previously published reliability and validity studies of

the inventory, the MIDAS has been favorably evaluated (Buros, 1999), suggesting support for use of the MIDAS within educational contexts.

As reported in the professional manual for the MIDAS (Shearer, in press), across several diverse student samples, mean internal consistencies of each MIDAS scale fall in the moderate to high range, with alpha coefficients ranging from .78 to .89 (median = .86). The test-retest reliability of the MIDAS has been assessed in three separate investigations, revealing one-month stability coefficients ranging from .76 to .92 (median = .84) and two-month stability coefficients ranging from .69 to .86 (median = .81) across the various intelligence scales (Shearer, in press).

The validity of the MIDAS has been examined via a series of investigations evaluating its construct, concurrent, and predictive validity. Results of these investigations have included expected correlations between MIDAS scale scores and several matched abilities tests. Since there are few standardized tests available for the non-academic intelligences it was decided to also compare MIDAS scales to Holland's (1997) interest types as measured by the Self-Directed Search (SDS) (Holland, 1995). This makes sense because as a measure of "intellectual disposition" there is a subset of MIDAS questions that inquire about active participation and expressed enthusiasm for many of the MI activities.

It was found that when the Linguistic and Logical-mathematical scale scores are combined there is a positive .59 correlation with estimated I.Q. The Linguistic scale correlates at .60 when a Vocabulary test is combined with an Expressive Fluency assessment. The Logical-mathematical scale correlates at .58 when an Abstract Reasoning and a basic Math test scores are combined. The Spatial scale correlates at .42 with a test of Spatial Relations.

There is an interesting pattern of correlations between the following MIDAS and SDS scales, respectively: Musical and Artistic (r = .52); Interpersonal and Social (r = .52); Visual-

spatial and Realistic (r = .51). The lowest correlations emerged between conceptually dissimilar MIDAS and SDS scales, respectively: Musical and Conventional (r = -.09); Musical and Realistic (r = -.07); Interpersonal and Realistic (r = .00) (see Shearer, in press).

Ecological validity is best established by examining criterion-referenced groups to see if their pattern of scores match with what is known to be true of such groups. These results will now be briefly summarized.

Middle School Student Groups:

The initial validity study of the MIDAS-KIDS assessment involved nearly 3,000 students from across the country. From this database the following statistics were derived from existing student groups. Students in the "High" groups are selected and screened for abilities appropriate to those specific programs.

Mean Percentage Scores by High / Average Middle School Student Groups

	Groups	
Scale	High Group	Average Group
	M	M
Musical	72 (Music Program)	56
Kinesthetic	67 (Dance Program)	54
Logic-math	61 (Music Program)	53
Spatial	70 (Visual Art Program)	57
Linguistic	66 (Drama Program)	54
Interpersonal	63 (Drama Program)	54
Intrapersonal	65 (Dance Program)	55
Innovation	60 (Drama Program)	52

Average Group: N=1,120

Dance Program: N=56, Art Program: N=114, Drama Program: N=55, Music Program: N=115.

High School Students

Seven different teachers at a small Catholic girls high school were asked to select at least 10 of the 70 ninth grade students who demonstrated strength in a particular area. For example, the math teacher selected students with strong Logical-mathematical skills and the English teacher choose students who were strong in Linguistic abilities. In the table below these high groups mean scores are compared to the remainder of the students.

	Groups	
	High	Others
Scale	M	M
Kinesthetic	73	60***
Linguistic	74	61***
Spatial	75	54***
Musical	74	60***
Math-Logic	60	52
Interpersonal	71	64
Naturalist	77	48***
Intrapersonal	51	59

T-test, two-tailed. *p<.10 **<.05 ***p<.01

Adults and College Student Criterion Groups

Criterion group scores are presented next that describe the mean percentage scores of college students and adults predicted to be high in designated areas. Mean scale scores for college students enrolled in designated college majors are summarized in the following table.

Mean Percentage Scores by High / Low College Student Groups (Defined by Enrolled Course)

	Groups			
	High		Low	
Scale	M		M	
Musical	73	(Music Theory)	41	(Student Leaders)
Kinesthetic	65	(Dance)	43	(Student Leaders)
Logic-math	68	(Number Theory)	36	(Developmental Math)
Spatial	66	(Interior Design)	43	(Developmental Math)
Linguistic	62	(Creative Writing)	54	(both math groups)
Interpersonal	65	(Student Leaders)	54	(Number Theory)
Leadership	65	(Student Leaders)	55	(both math groups)
Innovation	60	(Interior Design)	44	(both math groups)

Group sizes: n=14, Number Theory; n=20, Creative Writing; n=26, Dance; n=21, Developmental Math; n=35, Music Theory; n=24, Interior Design I; n=10, Interior Design Advanced; n=25, New Student Orientation Group Leaders.

This table presents the mean scores of groups of high school teachers from a variety of academic department areas.

Mean Percentage Scores by High and Low Teacher Department Groups

	Groups	
	High	Low
MIDAS Scale	M (Department)	M (Department)
Musical	85 (Music)	27 (Admin)
Kinesthetic	65 (Phys. Ed.)	38 (Family Sci.)
Logic-math	69 (Science)	39 (English)
	64 (Math)	
Spatial	62 (Science)	41 (English
	58 (Art)	
Linguistic	73 (English.)	51 (Math)
Interpersonal	75 (Admin.)	58 (Math)
	72 (Special Ed.)	
Intrapersonal	71 (Music)	57 (English)
	67 (Phys. Ed.)	
Naturalist	71 (Science)	39 (Family Sci.)

Group Sizes: n=11, Administrators; n=16, Art; n=35, English; n=16, Phys. Ed.; n=33, Math; n=3, Music; n=26, Science, n=21, Special Ed.

Adult Occupational Group Comparisons

This study involved over 400 adults in 18 different occupational groups. The sample sizes are small for each group so these results are preliminary and suggestive. The patterns of scale scores conform to expectations and are summarized here.

Mean Percentage Scores by High and Low Adult Occupational Groups

	Groups	
	High	Low
MIDAS Scale	M (Occupational Group)	M (Occupational Group)
Musical	73 (Musicians)	34 (Firemen)
Kinesthetic	67 (Dancers)	33 (Writers)
Logic-math	68 (Engineers)	33 (Writers)
Spatial	68 (Artists)	41 (Writers)
Linguistic	72 (Writers)	43 (Skilled Trades)
Interpersonal	68 (Psychologists)	45 (Engineers)
Intrapersonal	68 (Pilots)	49 (Writers)
Naturalist	82 (Naturalists)	39 (Principals)

Leadership	66 (Supervisors)	49 (Writers)
General Logic	66 (Pilots)	52 (Musicians)
Innovation	57 (Dancers)	44 (Police)

Group sizes: n=12, Pilots; n=13, Dancers; n=11, Police; n=15, Musicians; n=35, Naturalists; n=11, Principals; n=14, Writers; n=1, Artists; n=20, Psychologists; n=12, Skilled Trades; n=30, Engineers; n=14, Firemen; n=21, Supervisors.

Phase Two

The goal of Phase Two was to investigate how an MI profile might best be used by classroom teachers. This was a year-long project involving six public school teachers at the primary and secondary levels and the researcher. Teachers met with the researcher individually two or three times per month and as a group on a monthly basis during the school year. Teachers all completed their own MI profiles and were instructed on procedures for profile verification and interpretation. Each teacher selected one or more of their classes to have the students complete the MI assessment. Teachers then engaged students in MI activities including: profile verification, learning the MI language, study strategies, career exploration, family communication and curriculum development. Many of these activities were derived from a draft MI activity workbook developed by the researcher. Throughout the school year teachers made suggestions for the modification of this activity book to meet their classroom needs.

At the end of the school year teachers and students completed program evaluation surveys and were also interviewed. These interviews were transcribed and provided back to the teachers for their input and approval. Completed student workbooks were also reviewed.

Research Questions

The goals of this Pilot Project were to determine if the use of the MI assessment (and subsequent interpretative activities) by both teachers and students could develop MI awareness, promote acceptance of MI theory and increase the use of strength-based MI-inspired learning activities.

Results of Pilot Project

Awareness.

The first step in adopting the MI approach is to generate an in-depth understanding of the multiple intelligences by teachers. Having teachers complete their own MI profile was found to be an effective means to provide a personal experience with all the intelligences and their dimensions. Teachers reported that they benefited from the process of verifying their own MI profiles and then reflecting on how their profile impacts on their teaching approaches. One teacher described this benefit.

"An MI profile can sensitize teachers to their own weaknesses and help them to empathize with their students who are struggling. It helps to enhance that relationship so teacher and student can see each other as 'real people' and take one step closer to each other in a positive way. The teacher isn't the unapproachable only intelligent person in the classroom."

It was found that teachers were able to understand the MI profile not as a simplistic set of labels but rather as a richly descriptive narrative of their intellectual and creative life. This insight was useful when it came to reviewing their students' MI profiles. Teachers reported a number of benefits of reviewing their students' MI profiles and becoming aware of students' strengths. This high school teacher of "at risk" students describes a typical experience for her.

"I thought I knew Anthony well but I learned from his MI profile of his skill in music. His strength in kinesthetic made sense because he plays sports but his logical-mathematical scale was really higher than his grade in math class. We talked about why that was happening and attributed it to all his absences. If you're not there in class then it's hard to make sense of things.

His spatial is high and that made him feel good because he could see how it connected to careers he'd like to do. He then could begin to feel good about working. He's going into the Carpentry program. His family life is very difficult. His mother totally disowns him. His father is chemically dependent so he lives with his grandparents. The MI profile said to him, "You have strengths. You are worthwhile." Throughout this year Anthony has been one of our leaders and I think that is because he does have strengths and now he feels confident having seen it down on paper."

This comment highlights the second goal of this endeavor which was to see if students could benefit from becoming aware of the multiple intelligences and their own MI strengths.

The MI profile interpretation process employed with students was similar to that used by teachers. Our objective was to have students understand MI beyond "simplistic labels" and use the profile as a means to identify their intellectual strengths and their possible uses. It was found that the process of devoting 30 or 40 minutes to answering a long questionnaire increased students' MI awareness. This initial awareness was then deepened when they received their personal profile and engaged in a process of reflection, dialogue and verification.

After receiving the computer generated report students create a descriptive Brief Learning Summary (BLS) in their own handwriting. This BLS serves as the beginning of a three-way "dialogue of discovery" among the student, teachers and parents. Through this dialogue students are encouraged to validate their own MI Profile so that Intrapersonal

understanding may be enhanced and the Profile 'accepted' as a reasonable estimate of their abilities as this point in time.

The following student in the same "at risk" program speaks to the value of the MI profile for enhancing her self-concept and opening up possibilities for greater achievement.

"I've never been book smart but I know I'm not stupid. I now have a better understanding of myself in general. I didn't think I was big in linguistic so hadn't put much effort into it before. When I saw that my score on the linguistic writing scale was higher and that I might be good at it then I concentrated more on it and it worked! My English teacher has praised me on my stories. It gave me confidence to try something that I wouldn't."

Acceptance

A lack of sufficient *acceptance* of MI by faculty is a crucial yet unrecognized threat to sustained MI implementation. The passing of too many "fads" has hardened many teachers and administrators to the potential benefits of a seemingly new idea or program. Teachers not only need to recognize that MI exists but they also need to have personal experience with its benefits. When teachers review their own MI profile in light of personal life experiences and their teaching propensities it can have a profound effect on their acceptance of the validity of MI. Another powerful experience for promoting acceptance occurs when teachers see how the use of MI influences students. Acceptance can assist teachers in bringing a positive MI approach to their teaching even when they might be overwhelmed by the daily challenges as described by the following high school teacher.

"I shared my MI profile with my students and that was worth doing. It was good for them to see that there were many areas where I didn't do well. I think they see me more as a real person now. I see my students differently, more as real people, too. It was a two way street. It

is comforting and refreshing and it makes you feel good to recognize their strengths. It's hard teaching kids like this day after day where their weaknesses are all too apparent. The profile helps you to see beyond the negatives. If you get stuck with the negative then the game of school is lost. Enlightenment is not about being negative."

Student Acceptance

For students to move from mere MI awareness to acceptance and decision-making it takes teacher support and guidance. This process can be quite dramatic for 'at risk' students who have become disengaged from the academic world and manifest a negative school attitude.

"It's like he's turned a corner and his MI profile was a sign to help him make that turn. The profile is a reinforcement from the "establishment" that he can do well. Now when a class is difficult for Anthony he looks at it and says to himself, "How can I overcome this challenge?" rather than thinking that the teacher is out to get him or whatever the line of negative thinking that many kids are into that leads to failure. Not only does he have the confidence that he can take on the challenge but he and the other students now have actual tools that they can use to be successful. Whereas before whether they felt intelligent or not they for sure didn't think they had the necessary skills. Now they are not only confident they can do it but they have practical ways they can look at school and learning differently."

Implementing a "Strength-based" MI Perspective

The MI approach makes a unique contribution to the classroom experience because it broadens the definition of what constitutes "intelligent behavior" and who can be described as possessing "intelligence." It has long been recognized that teacher expectations of students is one of the most powerful predictors and influences of student achievement (Rosenthal & Jacobson, 1968). For this reason, successful MI schools actively seek out the strengths of individual

students in order to better engage them in the curriculum (Campbell & Campbell, 1999) rather than merely sorting students into broad superficial IQ-based ability groups: college prep (high ability); vocational education (average ability); and general program (below average). Of course, students learn at a very early age to sort themselves into these same categories by observing which students are "labeled" as smart in the classroom.

One teacher described how the MI profile could be used to reverse this negative self-concept.

"The MI profile is a good bridge for these students. It helps them stop the downward spiral because it connects them with their strengths. Often times when people try to help these kids it ends up crushing them because they focus on the negatives only. The message is, "You don't have this skill, you're doing this behavior that's bad. You're bad." The MI profile can help them walk that bridge and make that connection (between fantasy/reality, success/failure) easier because it says, 'OK, we're not all going to be strong in all of our areas but let's look at where we are strong and how we can use that in almost any situation.' Yes. That's a good Ah-Ha!"

The use of MI is not limited to special programs for 'at risk' students as is illustrated in these comments by an elementary teacher.

"I wanted to do this project because I think using MI is a better technique of teaching reading. I want students to know themselves better so they can help themselves to deal with their reading / math problems. I want to give them other ideas and options for studying- especially in the areas of their strengths. I also want them to be able to let others know what their strengths are- especially their peers. This helps to give them a confidence boost."

The use of MI language to describe students' intelligence profiles can bring the ideal of "strength-based, potential-oriented" philosophy into the reality of daily instruction and school

reform. One teacher offered the following observations about the effect of an MI profile on teachers and students alike.

"The MI approach gives the kids the chance to tap into their souls. It gives them a way to connect to their 'shining human potential,' their strength that will unlock their potential development. This project has been a good introduction so they may find things out about themselves that they didn't know or were hidden. When teachers identify areas of strength for students on their MI profiles and refer to them as an 'intelligence', this provides a basis for the building up of genuine confidence inspiring experiences. All of my students have some sort of diagnosis such as LD or ADHD. They need to hear about their strengths.

For all of these students I can see it in their eyes. I can sense the joy, dignity and self-respect that emerged as a result of this project. Part of this dignity probably came from the recognition that their strengths are also important in the world in terms of jobs and possible careers. When we discuss the question: Why not find a job that is compatible with your strengths? This really engages them in a positive way."

Discussion and Conclusions

What has been learned from these two phases of research? What do the data that we have uncovered so far indicate about the value of MI and the MIDAS for teachers and their art of teaching students? This work has been designed to build on the foundations laid down by other investigators, in particular; Howard Gardner (1993), Linda and Bruce Campbell (1999), Jie-Qi Chen, Mara Krechevsky and Julie Viens (1998). It is useful to preface our discussion with the concluding paragraph by Campbells in their review of six MI-inspired schools:

> Most of us become educators out of a desire to enhance the quality of life for children and youth. We work diligently to help students grow, develop and learn. Throughout our years in teaching, we seek out new curriculum and methodologies, trying one approach after the other, hoping to discover those that are the most effective. Perhaps, the most

> surprising finding from our study of MI schools is that restructuring is not necessarily achieved through external programs, resources, facilities, or district or state mandates. Indeed, meaningful restructuring first takes place within the minds of teachers and their beliefs about the nature and possibilities of their students. From there, all else follows. p. 97

The first challenge to MI implementation that this research has dealt with is to inform teachers about MI beyond superficial labels and misconceptions. If meaningful school change is to occur then it is our first duty to ensure that all of our teachers learn about MI in personalized and MI-inspired ways. MIDAS research shows that the MI profile can provide a "reasonable estimate" of a person's intellectual disposition and that the process of verification can provide teachers (and students) with a rich appreciation of the primary domains associated with all the intelligences. This process enhances self-understanding as well as giving teachers better awareness of students' MI profiles.

The second step that is vital to MI evolution is *acceptance* of MI by teachers and administrators (and students!). This requires a change in the core beliefs of many teachers regarding the nature of intelligence while for other teachers it affirms what they have 'intuitively' thought to be true about the uniqueness of all students. It cannot be assumed that all faculty members accept and believe MI to be of beneficial value just because they sat through one or more MI informational sessions typically associated with staff development programs. Acceptance is a deeply personal issue that cannot be forced upon teachers. Acceptance is a matter of personal growth. Once again we have heard teachers describe how reviewing their own MIDAS profiles changed their perspectives and approaches. This personal experience coupled with peer sharing discussion serves to shift the conversation from the factual realities of the MI to an emotional and personally meaningful level.

When teachers review individual student profiles the conversation shifts once again into that other personal realm of "my classroom." This discussion allows teachers to use the language of the MI "lens" to examine factors pertaining to student success as well as failures and frustrations. As we heard, teachers can use a student's profile to "open up" the discussion as student problems are being examined so that weaknesses are acknowledged at the same time that strengths are accentuated. This process can likewise occur when a teacher examines the group MI profile of one or more classrooms for comparative purposes.

This point was emphasized when one math teacher was surprised to learn that her morning algebra class was lacking in any students with Logical-mathematical strengths while her afternoon class was filled with them. This insight was useful, however, not for merely recognizing student group weaknesses. You could discover this with any good test. More importantly the MI profile went beyond describing weaknesses and identified strength areas of the weaker class that could be harnessed in the service of improving mathematical skills. This type of creative curricular-based problem-solving provides teachers with direct personal experience in using MI materials to enhance instruction.

Data from broad groups of students and well-defined adult criterion groups also provides empirical evidence that many teachers need to help answer their concerns about MIDAS validity. Because the MIDAS has passed many statistical tests required for test validation teachers have fewer qualms about its use. This holds true also for administrators and community members who are charged with implementing well-established forms of assessment. Teachers who have concerns about the validity of MI theory itself may wonder why the theory hasn't been validated statistically. The wide array of MIDAS data collected across all age groups and from a number

of different cultural groups- both inside the US and internationally (Chile, Denmark, Canada, Philippines) (Shearer, unpublisher paper) provides support for the theory's ecological validity.

The next major question that this work has investigated pertains to the practical utility of both the MIDAS profile and MI-inspired teaching approaches / activities. These research results echo and support the conclusions of other investigators (Campbell & Campbell (1999), Gardner (1993), Chen, Krechevsky and Viens (1998) that the adoption of MI beliefs, curriculum designs and instructional strategies provide many benefits for promoting student achievement.

Conclusions:

To conclude, let us revisit our opening quotation where we heard Howard Gardner advance the idea that quality assessment should be used to provide "useful feedback to the individuals and useful data to the surrounding community." The data collected thus far indicate that valid MI profiles can be obtained and that this information may be used by both students and teachers to further students' educational agendas. There appear to be several strengths of this assessment-discussion process. First, Intrapersonal competence is enhanced when teachers and students are made aware of their unique MI profiles and are given practical strategies and training for using their strengths to maximize learning. Second, the MI profile serves as a tangible basis for engaging a student's immediate community in strength-based, personalized educational planning.

A unique feature offered by this approach is that the MI profile can be administered to and interpreted for large groups of students efficiently as opposed to other time-intensive, individualized systems. This will enhance the chances that the MI approach will be successfully adopted by large-scale public institutions and not exclusively by small, independent schools. Another advantage evident from this work is that the MI assessment is something not merely

"done to students" but is a process that teachers, administrators and parents can (and should) participate in as equal partners in a "dialogue of discovery" that puts the individual's strengths at the heart of the discussion.

There are several limitations to this research that should be addressed in the future. First, it is reasonable that MI awareness can provide a basis for enhancing education and that building Intrapersonal competence can promote learning, but is this sufficient to make long-lasting differences in achievement? Probably not. Chen, Krechevsky and Viens describe how their successful one-year classroom MI project was unable to significantly improve students' achievement even though numerous other positive changes in behavioral and psychological factors were observed. They noted that concrete changes in academic skills of "at risk" students required more than one year's worth of effort. They also noted that the process of "bridging" to improve academic weaknesses via strength-based teaching strategies is quite difficult and likewise requires sustained effort over an extended period of time.

This research indicates that teachers and students alike can be informed and encouraged by an MI assessment but how can their efforts in using their MI strengths to improve cognitive limitations be sustained over an extended period of time? How can teachers continue to use MI-inspired teaching strategies after the initial novelty and enthusiasm and support wears off? How can students continue using their MI strengths to study in creative ways when they are embedded in systems (classrooms, home, neighborhoods, popular culture) that are not supportive of their "strengths vs. deficits" efforts? These are significant challenges to the full-fledged implementation of MI-inspired ideas that future research must address if MI is to fulfill its promise of promoting the development of "human potential."

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